

PATENT APPLICATION
08/975,679 (A7070)

claims 12 and 13 under 35 U.S.C. §103(a) as being unpatentable over Arbore in view of Huber. Applicants respectfully request favorable reconsideration of the application and allowance of all pending claims in view of the above claim amendment and the following remarks.

With regard to claim 20, 21, 27 and 28, Applicants correct the errors noted by the Examiner; therefore, claim 20, 21, 27 and 28 should now be allowable.

With regard to claims 1-13, Applicants respectfully submit that, firstly, the mechanism of pulse compression disclosed by Arbore is not applicable to optical parametric interactions in general and optical parametric generation in particular. Method of pulse compression disclosed by Arbore can only be accomplished through two-wave nonlinear interaction, such as second-harmonic generation. This pulse compression mechanism requires that nonlinear interaction for different wavelengths would be localized at different spatial positions (by different QPM periods) along the beam propagation direction. It is well known that parametric interaction is at least a three-wave interaction. Therefore, spatial localization of the parametric interaction does not occur, and pulse compression described by Arbore can not be achieved. Applicants' independent claim 1 requires use of OPG in a wavelength conversion channel. This emphasis on OPG is essential for Applicants' invention, because only three-wave interactions can provide a tunable output for a fixed input wavelength. Two-wave processes, such as SHG can only provide a fixed-wavelength output at exactly half of the input wavelength.

Furthermore, parametric generation (unlike parametric amplification or second-harmonic generation) is characterized by a certain threshold, which previously was prohibitively high for any direct use of femtosecond oscillators. Applicants' invention is the first demonstration of OPG achieved with pulse energies obtainable directly from a femtosecond oscillator. This became possible only due to the fabrication of highly-nonlinear quasi-phase-matched waveguides in PPLN. It is important to note, that practical implementation of this approach is technologically not trivial. It required finding viable solutions to such problems as multimode nature of a waveguide at pump wavelengths, limited interaction lengths in those waveguides and the degradation of material nonlinearity due to technological processes during waveguide fabrication, etc. Therefore, Applicants respectfully submit that ability to achieve low-threshold OPG in PPLN waveguides can not be considered as an obvious use of nonlinear interactions.


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Accordingly, claim 1, as well as its dependent claims 2-12 (which incorporate, by reference, all the novel and unobvious features of their base claim) would not have been obvious from Arbore and Huber, alone or in any reasonable combination, at least for the reasons noted above.

In view of the foregoing, Applicants respectfully request the Examiner to withdraw all rejections, and to find the application now to be in condition for allowance with claims 1-28. However, if the Examiner feels that the application is not now in condition for allowance, the Examiner is respectfully requested to **call the undersigned** to discuss any unresolved issues and to expedite the disposition of the application.

Applicants hereby petition for any extension of time which may be required to maintain the pendency of this case, and any required fee, except for the Issue Fee, is to be charged to Deposit Account No. 19-4880.

Respectfully submitted,



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